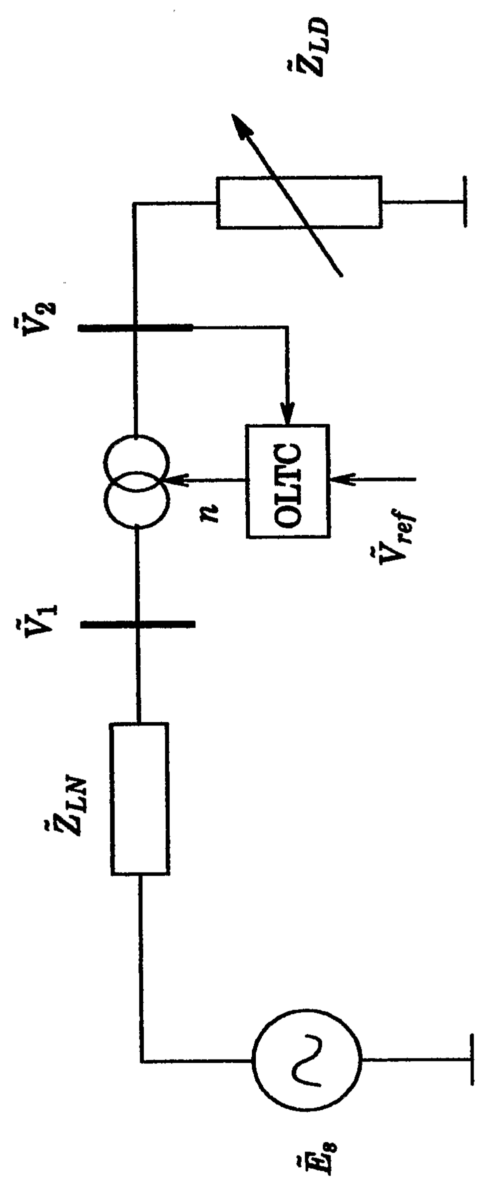

Figure 1: Two-node system with generator, transmission line, transformer and load.

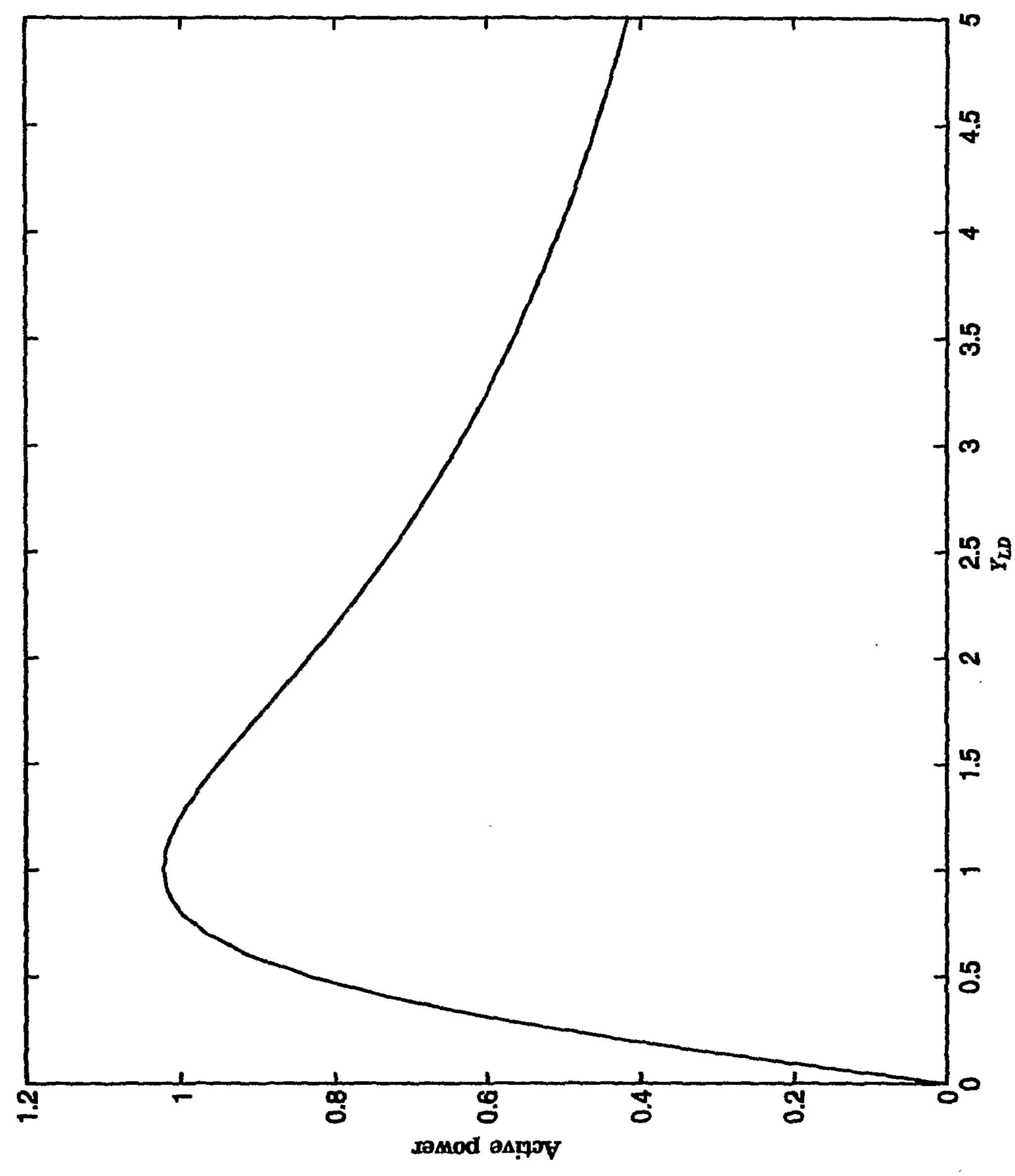

Figure 2: Active power with respect to load impedance. For a particular impedance the transfered active power reaches a maximum.

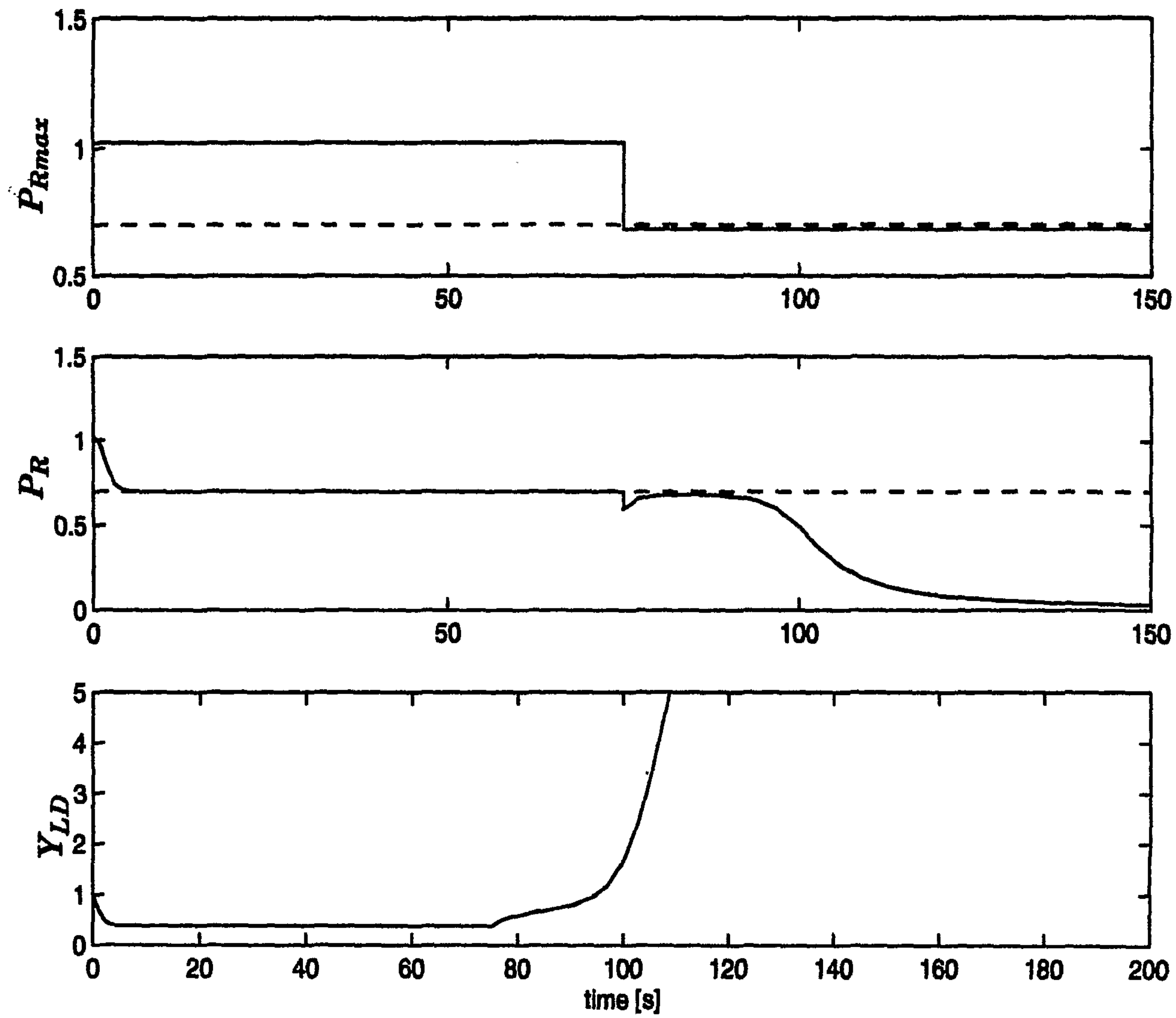

Figure 3: Instability in a two node system with recovery mechanism in the load. A fault is simulated at t=75 by increasing the line impedance. The load is trying to achieve the desired active power 0.7 (dashed line) by decreasing its impedance. Since the maximum achievable active power is just below 0.7, the system becomes unstable and will increase to infinity.

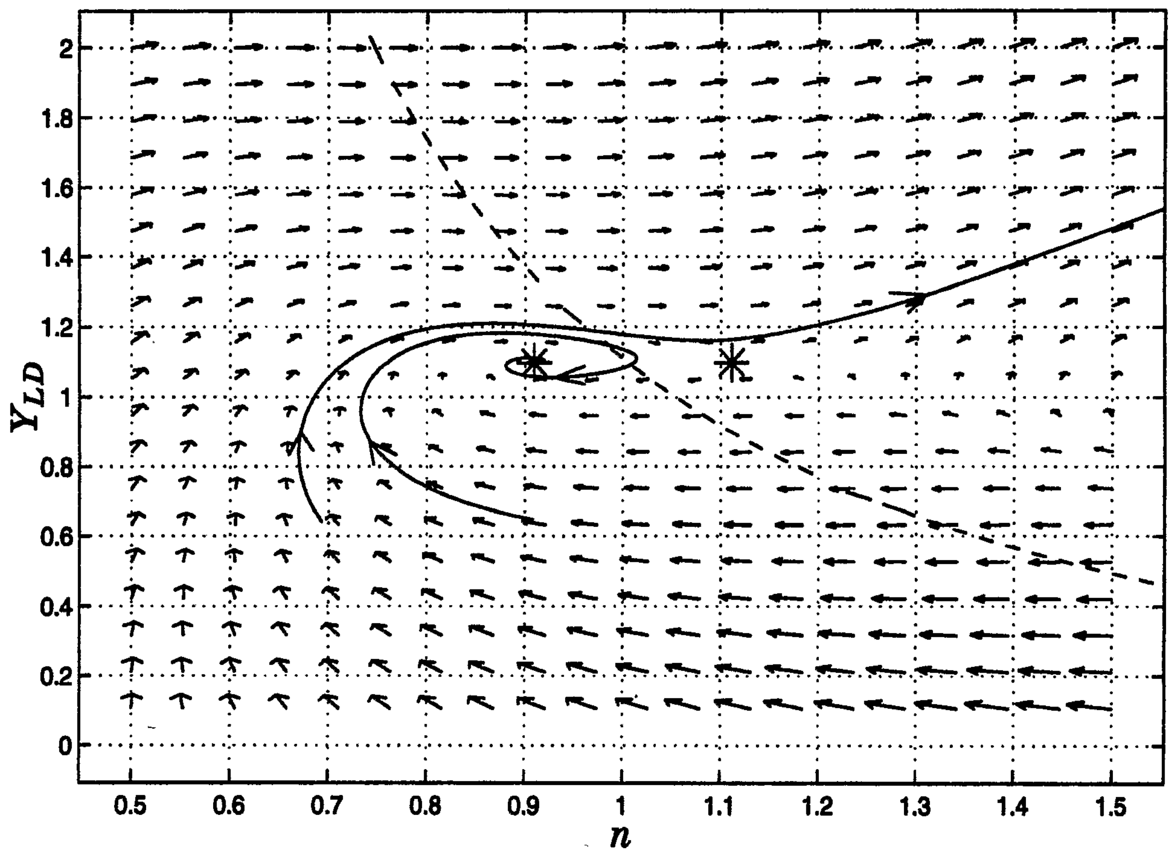

Figure 4: Vector field for the design model consisting of eqs. (1) and (2). The asterisks mark the two equilibrium points. The dashed curve is the loci for maximum power transfer, .

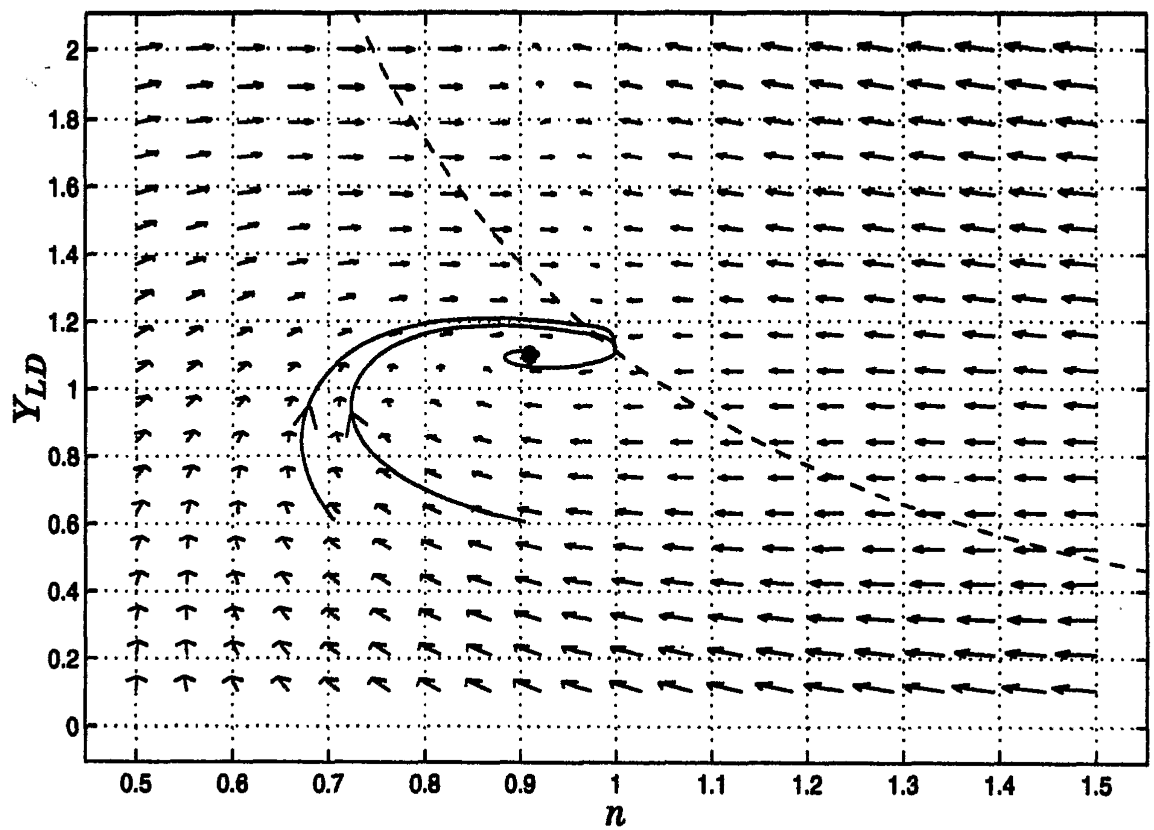

Figure 5: Vector field for the design model consisting of eqs. (1) and (2) with compensation. The dot marks the stable equilibrium point. The dashed curve is the loci for maximum power transfer, .

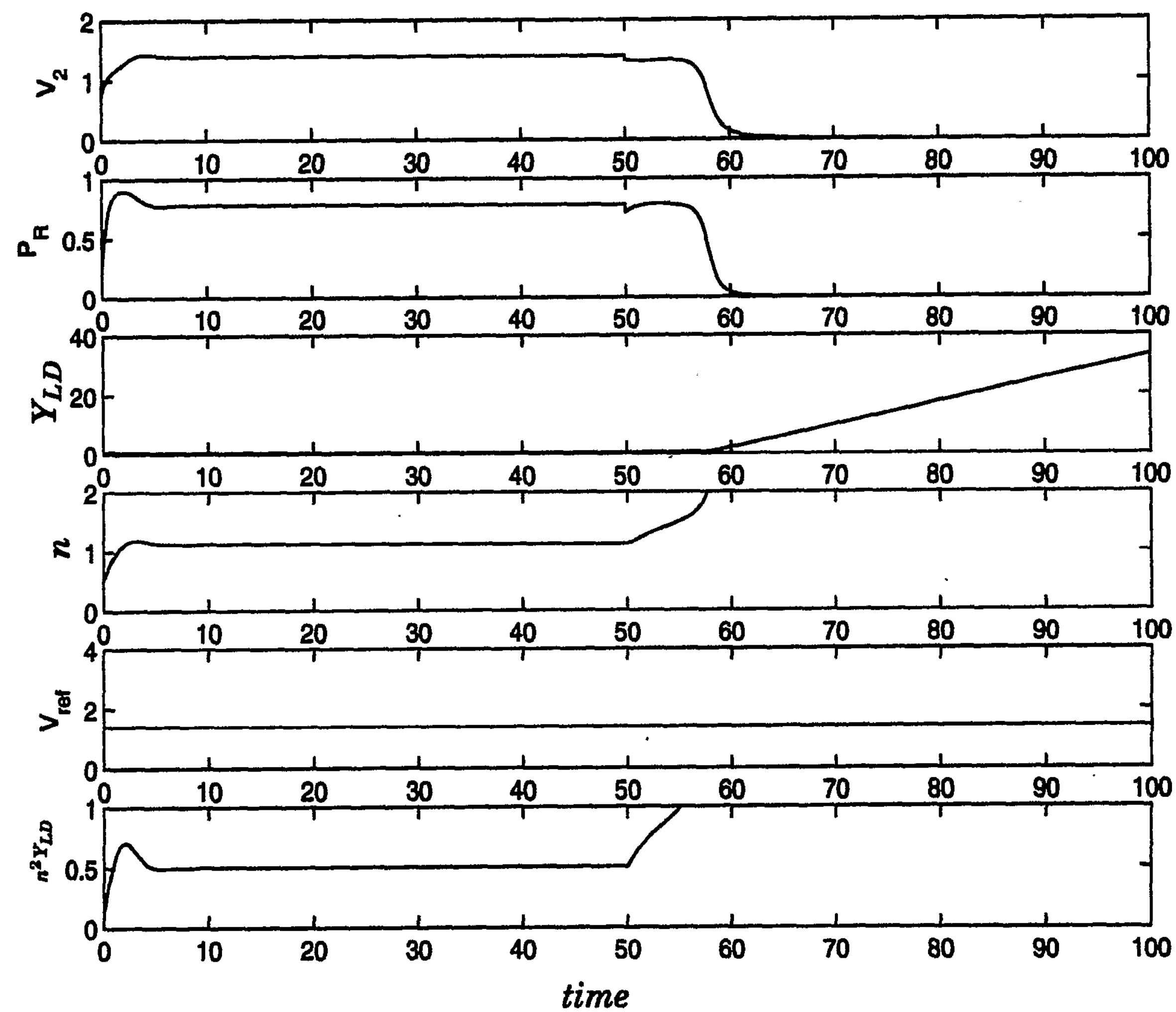

Figure 6: Due to a step change in , the nonlinearity *f* changes such that the stable equilibrium point is very close to the top and due to the overshoot in an excursion over the top of *f* will occur that leads to instability.

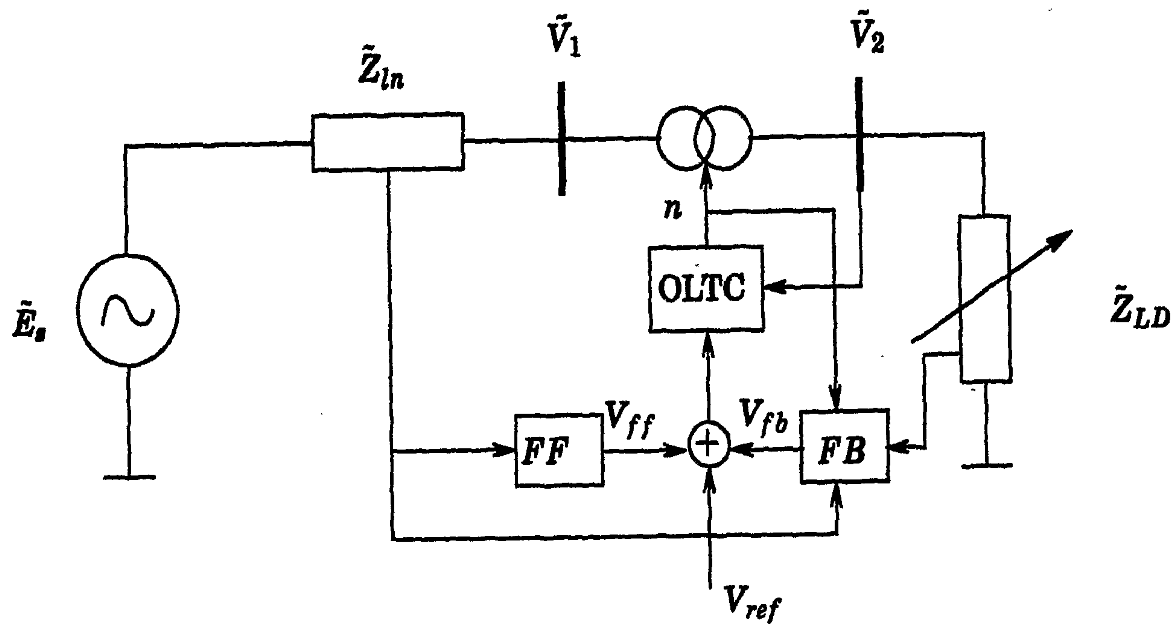

Figure 7: Two-node system with generator, transmission line, transformer and load. Dynamic compensation of the reference voltage is introduced through the blocks *FF* and *FB*.

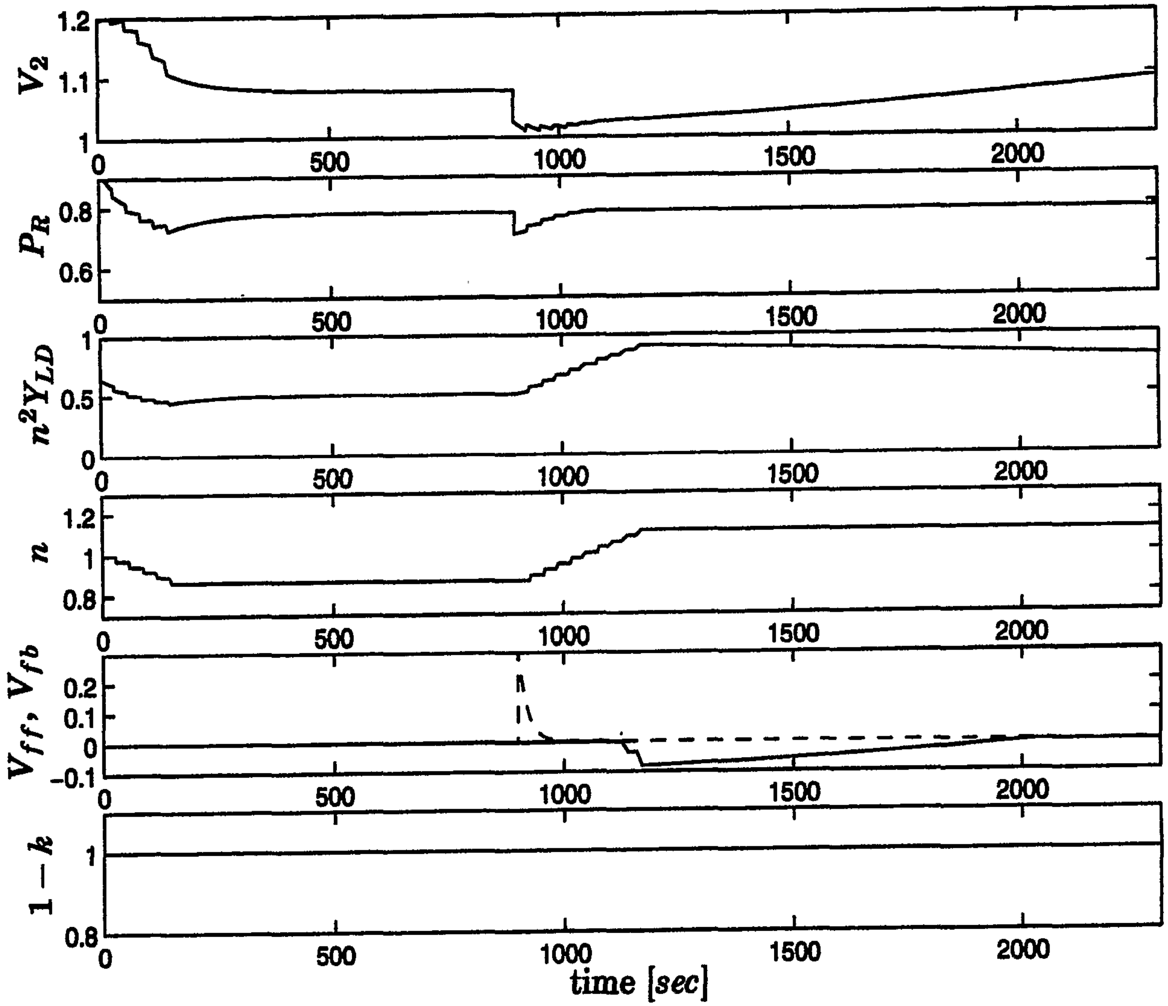

Figure 8: At t=800 seconds, a line tripping is simulated by a 20% increase of the line impedance . By momentary changes of the reference value by augmentation with (dashed line) and , stability is maintained without shedding load. In case the reference voltage had been kept constant, the system would become unstable.